REMARKS

The Examiner rejects claims 71-73 and 77-78 under 35 U.S.C. Section 103(a) as being unpatentable over Duyvesteyn (US 6,007,709) in view of Graham (US 5,143,598) and claims 74-76, 79, and 80-85 under Section 103(a) as being unpatentable over Duyvesteyn in view of Thompson (US 4,368,112).

Applicant respectfully traverses the Examiner's rejections.

The cited references fail to teach or suggest at least the following italicized features of independent claim 71:

> 71. A *sealed* process for treating a diluted tailings component, *comprising heated water, particulate mineral solids, precipitated asphaltenes and residual bitumen and solvent*, said component having been derived from bitumen froth by dilution and mixing of the bitumen froth with solvent and separation of the resulting diluted bitumen froth into a diluted bitumen component and said diluted tailings component, comprising:
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> *first* subjecting the *whole diluted tailings component* to a solvent recovery separation *by pressure moderation* to recover *substantially all* of the solvent in the diluted tailings component as a separate recovered solvent component and produce a solvent recovered tailings component containing water, solids, precipitated asphaltenes and *residual* bitumen and solvent;
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> *second* subjecting the *solvent recovered tailings component* to *gravity separation* to separately produce an overflow stream of *clarified* heated water and an underflow stream mainly comprising solids, precipitated asphaltenes and water; and
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> recycling at least part of the *clarified* heated water for re-use in the process.

The Examiner characterizes the Duyvestyn reference ("Duyvesteyn"), as teaching the steps:

> providing a tailings stream 28 comprising: bitumen, solvent, water and solids; sending this stream to a gravitational separation zone; producing, in this zone, an overflow stream comprising bitumen and solvent and a water stream, recycling the water stream; and recovering, from the overflow stream, solvent in a solvent recovery separation.

The steps from Duyvesteyn that the Examiner is relying on, in rejecting the claims, actually involve:

(a) gravity separations 30, 37 to separate the bulk of the solvent in the form of a very dilute bitumen phase 31, 38;

(b) recycling this separated solvent/bitumen phase 31, 38 to maintain the needed solvent/bitumen ratios in the CCD circuit; and

(c) subjecting a small residual portion 39 of the original bitumen froth tailings stream 28 to solvent recovery by distillation, said portion 39 consisting of solvent/precipitated asphaltenes, to separately produce asphaltene tails and solvent (column 10, lines 11-36).

As the Examiner has acknowledged, Duyvesteyn does not teach previously subjecting the bitumen froth tailings, fed to gravity separation, to solvent recovery because the bitumen is scrubbed from the secondary settler underflow. The source of water recycle 4 is an underflow from the primary and secondary gravity separations 30 and 37. Solvent recovery is practiced only *after* gravity separations 30 and 37 on a solvent/precipitated asphaltenes phase 39. In contrast, the present invention separates the solvent from the tailings and water **before** gravity separation to provide, surprisingly and unexpectedly, a higher degree of water recovery and recovered water purity.

Duyvesteyn has other deficiencies.

Duyvesteyn fails to teach, *inter alia*, that "substantially all of the solvent in the diluted tailings component" be separated in the solvent recovery step, whereas only a small portion of the solvent originally in Duyvesteyn's feedstock, namely bitumen froth tailings 28, is recovered by distillation step 46.

Duyvesteyn teaches that the process is open to the atmosphere. The claimed process, by contrast requires the process to be sealed.

Duyvesteyn teaches that solvent recovery separation be effected by distillation. The claimed process, by contrast, requires solvent recovery separation to be effected by pressure moderation.

Duyvesteyn teaches that the recycled water 45, 40 is not subjected to solvent recovery by distillation – instead it is recovered as the underflows from the gravity separations 30, 31. As a consequence the recycled water is settled in the presence of copious amounts of solvent and, in applicant's view, does not meet the requirement that it be 'clarified', as called for by applicant's claim 71. In contrast, and in accordance with claim 71, applicant's water 82 has been produced from a solvent-free mixture by gravity separation.

In summary then, there are a number of differences between the subject matter of applicant's amended claim 71 and the disclosure of the Duyvesteyn reference. It follows that the person of ordinary skill in the art would not gain a motivation from Duyvesteyn to substitute distillation for the far less expensive gravity separation taught by Duyvesteyn, which is used to separate and recover the bulk of the solvent – nor would he follow such substituted distillation with a gravity separation step (the solvent would already be gone). Otherwise stated, the Duyvesteyn reference advocates: separating out the bulk of the solvent in the form of very dilute bitumen phases 31, 38, by gravity separations 30, 37, and recycle phases 31, 38 to the CCD circuit to maintain solvent/bitumen ratios therein; and then recovering residual solvent from the relatively low volume solvent/precipitated asphaltenes phase 39 by distillation.

The Examiner then asserts relies on *In re Burhans* and MPEP 2177.04 IV.C, and states the following:

> "It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Duyvestyn to include where the solvent recovery step is performed before the gravitational separation because according to in re Burhans the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results".

Applicant submits that its claimed process does produce a "new or unexpected result". Specifically, applicant points out:

- that by removing the solvent in a first step;
- the subsequent gravity separation step yields clarified heated water, presumably because the precipitated asphaltenes, now no longer tied in a suspended state with the solvent, are better able to settle and report with the solids.

In conclusion then, it is respectfully submitted that the Examiner has not established prima facie obviousness with respect to applicant's claimed subject matter by relying on the Duyvesteyn reference coupled with *In re Burhans*.

To overcome the deficiencies, the Examiner relies on U.S. 5,143,598 to Graham, et al. ("Graham"). Graham teaches: grinding tar sand in contact with water and a solvent for the bitumen in the tar sand, the solvent being supplied in an amount to solubilize the bitumen and cause the sand to report to the aqueous phase; separating and removing the bitumen-rich solvent phase, for example by gravity separation, leaving a water/solids/residual solvent mixture; and recovering the solvent in the water/solids/residual solvent mixture by steam stripping.

Graham does not teach that, when one subjects whole froth tailings to solvent recovery as a first step and then follows with gravity separation of the solvent-free residue, clarified heated water will separate and become available for recycle. Graham teaches gravity settling first, to recovery the bitumen and solvent, and then steam stripping to recover residual solvent from the water/solids residue, which stripped residue is discarded.

In conclusion then, it is respectfully submitted that the collective effect of Duyvestyn, *In re Burhans* and Graham, fails to come together to make obvious the subject matter of applicant's amended independent claim 71 and the claims dependent thereon.

Accordingly, the Examiner is respectfully requested to withdraw the 35 U.S.C. §103(a) rejection of Claims 71-73, 77 and 78.

The Examiner has rejected the subject matters claimed by claims 74-76, 79 and 80-85 as unpatentable (obvious) over Duyvesteyn in view of Thompson. These claims are dependent on claim 71. Claims 76, 79 have been cancelled, leaving claims 74, 75 and 80-85 at issue.

The disclosure provided by the primary reference Duyvesteyn and its shortcomings relative to claim 71 have already been reviewed.

The Examiner states that Duyvesteyn discloses everything in claims 71-73, 77-78 but does not disclose that the solvent recovery zone comprises first and second stages which produce underflow and overflow streams, where part of the underflow from each stage is pumped back to the stage from which it issued, to agitate the tailings component.

The Examiner asserts that Thompson discloses:

> "that the solvent recovery of the prior art was accomplished through a series of distillation means in order to boil off the solvent from the oil."

Thompson goes on to state:

> "Therefore, it would have been obvious to one having ordinary skill in the art .. to modify the Duyvesteyn process to include where the solvent recovery was accomplished through a series of distillation means in order to boil off the solvent from the oil because such a method is prior art."

In response, Applicant counters as follows:

- as already argued, Duyvesteyn fails to render obvious the subject matter of claim 71 and therefore the claims dependent thereon should be allowable as well;
- the feature that claims 74, 75 are directed to is the combination of:

- providing two stages of solvent recovery separation by pressure moderation; and
- recycling part of the underflow from each stage back into the stage to provide agitation therein; and

- the feature of claims 80-85, which are dependent on claims 71/73, is:
  - the provision of gas flotation in the gravity separation step being practiced on the solventless SRBC 66 stream; and
- neither of these features are disclosed by Thompson.

The Examiner acknowledges that Thompson fails to disclose the recycle of a portion of the solvent recovery underflow to the stage from which it issued. However the Examiner asserts that it is obvious to do so, contending that it would be obvious to recycle a product from a separation back to the separation zone "to achieve a higher degree of separation of the final product."

Applicant points out that claim 74 recites that the recycle is carried out "to agitate diluted tailings component undergoing separation in the stage." The purpose of the recycle in the present case differs.

Applicant has added new claims 86-89. The prior art fails to teach at least the following italicized features of independent claims 86 and 89:

> 86. A process for treating a diluted tailings component, comprising heated water, particulate mineral solids, precipitated asphaltenes and residual bitumen and solvent, said component having been derived from bitumen froth by dilution and mixing of the bitumen froth with solvent and separation of the resulting diluted bitumen froth into a diluted bitumen component and said diluted tailings component, comprising:
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> subjecting at least most of the *diluted tailings component* to a solvent recovery separation to recover *substantially all* of the solvent in the diluted tailings component as a separate recovered solvent component and produce a *solvent recovered tailings component* containing water, solids, precipitated asphaltenes and residual bitumen and solvent; and
>
> *thereafter* subjecting the *solvent recovered tailings component* to *gravity separation* to separately produce an overflow stream of *clarified* heated water and an underflow stream mainly comprising solids, precipitated asphaltenes and water, the underflow stream comprising most of any residual solvent, solids, and precipitated asphaltenes in the *solvent recovered tailings component*.

> 89. A method, comprising:
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> (a) separating an oil sand slurry into first, second, and third product streams, the first product stream comprising most of the bitumen and asphaltenes in the oil sand slurry, and fine solid material, the second product stream comprising fine solid material,

and bitumen and asphaltenes, and the third product stream comprising coarse solid material;

(b) contacting the first product stream with a diluent solvent to form a mixture;

(c) thereafter separating the first product stream and diluent solvent mixture into a diluted bitumen component comprising *substantially all* of the bitumen and *diluent solvent* in the mixture and a diluted tailings component comprising the fine solid material, bitumen, precipitated asphaltenes, and diluent solvent;

(d) *recovering substantially all of the diluent solvent from the diluted bitumen component*;

(e) subjecting at least most of the diluted tailings component to a solvent recovery separation to recover *substantially all* of the solvent in the diluted tailings component as a separate recovered solvent component and produce a solvent recovered tailings component containing water, solids, precipitated asphaltenes and residual bitumen and solvent; and

(f) *after step (e),* subjecting the *solvent recovered tailings component to gravity separation* to separately produce an overflow stream of *clarified* heated water and an underflow stream mainly comprising solids, precipitated asphaltenes and water, *the underflow stream comprising most of any residual solvent, solids, and precipitated asphaltenes in the solvent recovered tailings component.*

In contrast, Duyvesteyn teaches that the bitumen froth tailings 28 include *most* of the diluent solvent. Thus, the feedstock to solvent recovery in the process of Duyvesteyn differs substantially from the feedstock to solvent recovery in the process of claim 89. Additionally, the source of Duyvesteyn's feedstock, namely a CCD circuit, differs from the source of claim 89's feedstock, which produces three product streams.

Based on the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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